Remarks

Claims 1-24 are now pending in the present application, of which claims 1, 6, 9 and 17 are amended. Claims 1-24 stand rejected. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1, 2, 5, 6, 9, 10, 13, 14, 16-18 and 23 are rejected under 35 USC § 103(a) as being unpatentable over Goto (U.S. Patent Application Publication 2004/0165766) in further view of Vining (U.S. Patent 5,782,762). Claims 1-24 are rejected under 35 USC § 103(a) as being unpatentable over Argiro (U.S. Patent 5,986,661). Applicants respectfully traverse these rejections for reasons set forth hereafter.

Claim 1 has been amended to recite, in part, "processing said plane within said volume data set to form multiple enhanced images, the processing configurable to allow processing in real-time while acquiring said ultrasonic volume data set and configurable to allow processing after said ultrasonic volume data set is stored." Independent claim 9 has been amended to recite, in part, "processing said data set within said plane with image enhancing techniques, the processing configurable to allow processing in real-time while acquiring said data set and configurable to allow processing after said data set is stored." Independent claim 17 has been amended to recite, in part, "a processor for processing said series of adjacent scan planes, said processor identifying a plane having at least one thickness within said volumetric data set being transverse to said series of adjacent scan planes, said processor processing said plane with image enhancing techniques, said processor configured to process both in real-time while receiving said ultrasound signals and after said volumetric data set is stored."

Both Goto and Vining are directed to processing a volume of data and displaying an image associated with the data. However, neither Goto nor Vining are able to process or include a processor configured to process both in real-time <u>and</u> after the acquired data is stored. Goto and Vining each only disclose processing computed tomography (CT) data after the acquired data is stored. For example, Goto uses CT value counting memories, shown as MA on FIG. 1, for counting pixels that have a certain CT value or are within a range of CT values. Referring to FIG. 2A of Goto, "all the CT value counting memories MA1 to MAn are cleared in

step 41, and a first projection line L1 is set in step 42." (Para. 46, lines 1-3). Pixel values associated with the projection line are read out and added to the appropriate counting memory. Then, in step 44, once all of the projection lines are completed, the process is complete. (Para. 48). Therefore, Goto determines the values of the pixels once and bases any and all subsequent processed images on this determination. Goto thus does not process any data in real-time.

Turning to Vining, Vining acquires the imaging data and then transfers the data to a different work station for processing. Vining states that "[a]fter insufflation, the colon is then scanned, at step 45 of FIG. 1, by a helical CT scanner 22 to produce a series of two-dimensional images 12 of the colon." (Col. 8, lines 35-37). "The set of CT images 12 consisting of up to 500 images is then extracted, at step 50 of FIG. 1, from a database on the computer console 24 in compressed format. Once the data has been extracted, the data is transferred from the console 24 at step 52 to Fig. 1, over a fiberoptic network 25, to a graphics computer work station 26." (Col. 9, lines 10-15). Therefore, Vining also does not process any data in real-time.

In addition, although Vining allows a user to select a slice through a volume, the slice, also referred to as an orthoslice, is selected to aid the user in defining thresholds to be applied to the volume and is not used to present multiple enhanced images simultaneously. The unprocessed orthoslice is displayed simultaneously with a threshold image and the threshold range can be manually adjusted to produce a good match between the thresholded image and the anatomical detail of the orthoslice. (Col. 11, lines 52-57). "The threshold range thus obtained by thresholding the orthoslice is then applied globally to the volume of data at step 79 of FIG. 5 to create a thresholded volume." (Col. 11, lines 65-67). Therefore, Vining displays only one enhanced image at a time that is based on the orthoslice. Furthermore, Vining does not disclose displaying multiple enhanced images based on multiple anatomic features within the slice elsewhere. Therefore, claims 1, 9 and 17 are patentable over Goto in view of Vining.

Turning to the dependent claims, claim 6 recites "said presenting step further comprising presenting said multiple enhanced images in real-time." Because neither Goto nor Vining process the image data in real-time, neither reference discloses presenting multiple enhanced images in real-time.

Turning to the 103 rejection of claims 1-24 as being unpatentable over Argiro, Argiro does not disclose at least any processing in real-time while acquiring the data set or processing in real-time when receiving ultrasound signals. Instead, Argiro only processes data that has previously been acquired, such as on an Advanced Diagnostic Viewer (ADV), which is a three-dimensional medical imaging workstation (Col. 6, lines 18-21), or other three-dimensional graphics hardware. Argiro states that "[t]he ordering of the work flow permits a user to, inter alia, quickly retrieve data such as ultrasound, CT or MRI data over a network, such as that of a hospital." (Col. 7, lines 52-55). Furthermore, it is submitted that Argiro does not make up for the deficiencies of Goto and Vining. Therefore, claims 1, 9 and 17 are patentable.

In addition to the deficiencies discussed above, Argiro also does not disclose several other elements of at least the independent claims 1, 9 and 17. The Office Action states that "Argiro discloses a method for viewing a set of voxel data on a device." (Page 3). The Office Action, however, does not address all of the elements of the claims, and thus appears to find that these elements are obvious to one of ordinary skill in the art. For example, the Office Action does not provide any citation or direction to Argiro that would demonstrate Argiro's purported disclosure of the recitation of claim 1 of "acquiring an ultrasonic volume data set having multiple anatomic features," the recitation of claim 9 of "acquiring a data set comprising volumetric data" or the recitation of claim 17 of "a transducer for transmitting and receiving ultrasound signals to and from an area of interest" and "a receiver for receiving said ultrasound signals comprising a series of adjacent scan planes comprising a volumetric data set." Because the elements were not mentioned in the Office Action, Applicants are unsure if this rejection is intended to constitute Official Notice on the part of the Examiner.

If the Examiner is taking Official Notice, for example, of facts in the Examiner's personal knowledge rather than the prior art, Applicants respectfully traverse each of the Examiner's assertions. Under MPEP § 2144.03, the Examiner is now obligated to cite references or other documentary evidence in support of the Examiner's assertions. Alternatively, if the Examiner's assertions are based on facts within the personal knowledge of the Examiner, the facts must be supported by an affidavit from the Examiner.

Turning to the dependent claims, claim 8 recites "identifying thicknesses of said plane for each of said multiple enhanced images" and "wherein the processing said plane within said volume data set being based on said thicknesses, each of said multiple enhanced images being based on a different thickness." In contrast, Argiro adjusts the thickness of <u>all</u> of the displayed slices simultaneously, stating that "thickness slider 300 permits a user to enlarge the size of the slices shown in the MPR views of subwindows 310, 312 and 316" (Col. 23, lines 23-25). Therefore, Argiro is silent with respect to identifying a different thickness for each plane.
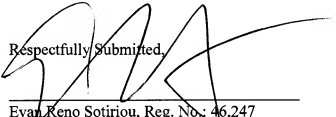
Dependent claim 12 recites "identifying a depth based on said data set, said plane having different thicknesses based on at least one of said depth and said different image enhancing techniques." Dependent claim 19 recites "an input for identifying the plane within said volumetric data set; said processor identifying a depth based on said volumetric data set" and "at least one thickness control setting said at least one thickness based on at least one of said depth and said image enhancing techniques." Argiro, however, states that "[w]hen examination viewer component 114 is first entered from image gallery component 112, the MPR two-dimensional images automatically show the middle slice of the viewing orientation." (Col. 22, lines 44-47). Therefore, Argiro does not identify a depth based on the data set, but instead uses the same depth, the middle slice, for presenting all data sets. Also, as Argiro does not identify the depth, Argiro does not disclose the recitation of having different thicknesses based on at least one of said depth and said different image enhancing techniques nor the recitation of setting at least one thickness based on at least one of said depth and said image enhancing techniques.

Dependent claim 22 recites, in part, "said transducer further comprising having a transducer type, said processor further comprising identifying a subset of said image enhancing techniques based on said transducer type." Argiro is not concerned with a transducer type and does not disclose identifying a subset of said image enhancing techniques based on said transducer type.

Applicants further submit that the dependent claims recite additional subject matter neither anticipated nor rendered obvious by the cited prior art. Moreover, the dependent claims are allowable based at least on the dependency of these claims from the independent claims.

In view of the foregoing amendments and comments, it is respectfully submitted that the cited references neither anticipate nor render obvious the claimed invention. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,

Date: __August 22, 2008__

Evan Reno Sotiriou, Reg. No.: 46,247
THE SMALL PATENT LAW GROUP, LLP
225 South Meramec, Suite 725
St. Louis, Missouri 63105
(314) 584-4080